Use of IDEF Modeling to Develop an Electronic Patient Record for Drug and Alcohol Outpatient Treatment Clinics

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This electronic poster demonstrates the Automated Clinical Information System (ACIS) that was the result of Integrated Definition (IDEF) modeling. By September, ACIS will have been prototyped at two sites. Modules include: 1) Patient Identification, 2) Collateral Information, 3) Triage, 4) Biopsychosocial Assessment, 5) Integrated Summary, 6) Treatment Plan, 7) Treatment Progress, 8) Discharge and Aftercare, 9) Clinic and Provider Patient List, 10) Clinic Schedule, 11) Clinic Administration, 12) System Administration, 13) Activity-based and Required Reports, and 14) Patient Surveys.

We used IDEF modeling to describe present and idealized patient care activities. A logical IDEF data model was created to support those activities. Few information systems create a standardized clinical patient record in which there are discrete and concise observations of patient problems and their resolution. Clinical notes usually are narratives which don't support an aggregate and systematic outcome analysis. Many programs collect information on diagnosis and coded procedures but are not focused on patient problems. IDEF methodology has been accepted by the Department of Defense as part of the Corporate Information Management initiative and serves as the foundation that establishes a need for automation.

In October, 1992, the US Army Drug and Alcohol Drug and Alcohol Policy Branch established a Center for Addiction Medicine at the Uniformed Services University of the Health Sciences (USUHS) to create the IDEF models and prototype an electronic record. Military drug and alcohol treatment programs provide a comprehensive clinical care model. Patient placement criteria must account for life-threatening medical and psychological conditions. Complete biopsychosocial assessments cover multiple psychiatric and medical acute and chronic problems, and social problems to include family, legal, financial, spiritual, occupational, educational and recreational issues.

IDEF modeling is an industrial engineering methodology and has been used frequently by organizations engaged in business process re-engineering. Mutually exclusive activities are defined by action verbs and decomposed as needed. Each activity has a clear definition of an action that needs to be taken. Inputs, controls (regulatory guidance), outputs, and mechanisms (ICOMs) are established for each activity. Any relationship an activity has with another is established through ICOMs.[1] A literature search reflects that this project is one of the few attempts to apply IDEF modeling to a medical clinic setting.

Our current activity model was developed through an intensive study of an outpatient clinic and validated at six other clinics. Some activities were found to be time consuming and without clinical value. Assessing "improvement opportunities" suggested these activities for elimination. Activities which were considered important or "value-added" are considered for automation. Unanimous consensus for the idealized activity model was achieved at the 1993 Drug and Alcohol Program Clinical Directors Conference.[2]

The data model provides the logic to develop a prototype electronic patient record. Establishing a good data model which incorporates the business rules described by the activity model is not intuitively obvious. We attempt to capture data logic through computer screen designs which are developed by following the process of patient-provider interactions. There is high value to a "one-write" data system which is intuitively easy to use and highly secure. This requires a graphical user interface, rapid response times, and information flow that matches clinical need.

References:
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2. Hoffman K, Keithley. Comprehensive modeling of critical health care activities, costs and data needs within the context of addiction rehabilitation. In Grundfest WS (ed) Health Care Technology Policy I: The Role of Technology in the Cost of Health Care, Proceedings SPIE vol. 2307, 1994, pp. 412-422.

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